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ABSTRACT

What are the four different types of questions of concern in an evaluation study and how can concept questions be recognized and answered? These issues are addressed in this paper, in the framework of a compensatory education program evaluation. The discussion includes (1) the identification of concept questions and how they are different from fact, technical, and value questions; (2) a description of three types of analysis (differentiation, generic, and conditions) useful in dealing with concept questions in evaluation; and (3) a discussion of the use of concept maps in evaluation. (PN)

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No. 61 CONCEPT ANALYSIS IN EVALUATION

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PREFACE

The Research on Evaluation Program is a Northwest Regional Educational Laboratory project of research, development, testing, and training designed to create new evaluation methodologies for use in education. This document is one of a series of papers and reports produced by program staff, visiting scholars, adjunct scholars, and project collaborators--all members of a cooperative network of colleagues working on the development of new methodologies.

What are the four different types of questions of concern in an evaluation study and how can concept questions be recognized and answered? These issues are addressed in this paper which includes a description of three types of analysis (differentiation, generic, and conditions) of use in dealing with concept questions in evaluation.

Nick L. Smith, Editor
Paper and Report Series

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CONCEPT ANALYSIS IN EVALUATION

This paper is about thinking in relation to evaluation and how to bring clarity to our thoughts. The techniques of concept analysis were established over forty years ago, and though they have suffered from being tied too tightly to the apron strings of certain schools of modern philosophy, a great deal of headway has been made since then. In a quiet way, they have caused something like a revolution in the approach to questions of a certain type, namely concept questions.

Concept analysis can provide the evaluator with methods which the evaluator can learn to use in answering many of the more important and interesting questions which can be asked in relation to an evaluation. The importance of concept analysis to evaluation has been little realized. General and abstract questions cannot be tackled without the techniques of concept analysis in any but the most feeble and confused manner. It is little realized that the techniques can be learned quite easily.

The paper begins by discussing the identification of concept questions and how they are different from fact, technical, and value questions. Following this, three strategies for concept analysis are discussed in some detail. The paper ends with some discussion of the use of concept maps in evaluation.

The Relation of Concept Questions to Fact, Technical, and Value Questions

What is a concept question and how is it different from other questions in an evaluation? There are at least four major types of questions asked in an evaluation: technical questions, fact questions, value questions and concept questions. An evaluation is designed to answer value questions, and the other three types

of questions have to be answered in order to answer the value questions. If a compensatory education program is to be evaluated, the following are examples of the four types of questions:

Technical question: How might the effect of the compensatory education program be determined?

Fact question: Does the compensatory education program have an effect?

Value question: Is the compensatory education program any good?

Concept question: Is compensatory education equivalent to the promotion of equality of educational opportunity?

Technical questions are asked and answered on the way to determining the answers to fact questions. Technical questions are asked in relation to the design of an evaluation, and to the data gathering techniques used. Typically, technical questions are "how" questions.

In contrast to the other questions, only knowledge about the world is needed to answer fact questions. The answers to value questions and concept questions, and possibly to technical questions, are matters of human choice which is not true for fact questions. Value questions cannot be answered without reference to the answers to certain fact questions.

Value questions are questions regarding the worth of things. They can readily be recognized, since they contain evaluative or rating terms like "good," "efficient," "better," "right" and "desirable." Value questions sometimes begin with the terms "ought" or "should" which are also evaluative terms. Such questions are prescriptive questions, i.e. questions asking what to do. If some action ought to be taken, then it is either right or desirable to take the action. A value question is a question about some value object, e.g., compensatory education programs. While the answers to value questions are not dependent upon nor derivable from facts alone, the answers to value questions differ when there are differences in facts and these facts must be relevant to the answer.

Concept questions are questions about meaning. In the above example of a concept question, in order to answer the question it is necessary to explicate the meaning of the concepts of "compensatory education" and "equality of educational opportunity." Explication of the meaning of concepts is known as concept analysis. Concept analysis is not simply giving definitions to the meanings of terms or looking up their meanings in dictionaries. Some philosophers claim that the analysis of a concept is the description of its use. Complete descriptions specify the context or contexts of usage, different meanings in different contexts, different thoughts which are possible with different uses, and exhibits of different applications of the concept (Gowin, 1979).

How are the four types of questions related? The aim of evaluation is to answer questions of value, and to do this one needs the answers to questions of fact. Gathering facts requires technique and, thus, the answers to technical questions. In the above examples, the technical, fact and value questions included the concept of "compensatory education." Unless one is clear about this concept, one cannot answer the technical, fact and value questions. Thus it is not only important to isolate the concept questions but to deal with them first. Concept questions are the most basic and fundamental of all the questions.

It is only rarely that one is presented with a question of concept in pure form such as in the example given above. Consider the following two questions. Does compensatory education result in equality of educational opportunity? Is compensatory education important for equality of educational opportunity? The first question is a fact question and the second question, a value question. In order to answer either of these questions it is necessary first to carry out a conceptual analysis to explicate the meaning of "compensatory education" and "equality of educational opportunity." Thus, in order to answer technical, fact or value questions, it is recommended that conceptual analysis be carried out first. Doing prior conceptual

analysis will sharpen subsequent inquiry. Without it we just proceed at our current level of understanding.

Consider the example: Suppose an evaluator said, "That is a good program." We would probably want to ask, "What do you mean by a good program?" This is a question of concept because we want to know what counts as a "good progam." Yet it would be wrong to say that we are asking for the meaning of the word "good." "Good" is a very common word, which we use correctly every day. It means, roughly, "to be commended" or "to be approved" or "desirable." We know this already. Yet we still ask, "What do you mean by a good program?" Questions of concept are not concerned with the meaning of a word. Words do not have only one meaning. Indeed, in a sense they do not have a meaning in their own right at all, but only in so far as people use them in different ways. It is better to say that we are concerned with actual and possible uses of words. That is why it is no use looking up the word in a dictionary. It will not help when we ask, "What do you mean, a good program?" What we are really saying is, "What counts as a good program with you?" or, "What are the criteria for a good program?" (Wilson, 1963)

Answering a concept question is not a matter of defining terms. For the whole point of asking such questions is that the definition of these words is unclear. Or, we might rather say that they do not have definitions, but only uses.

Concept questions are not technical, fact or value questions. Nor are they questions concerned with the meaning of words, or the definitions of words. They are concerned with the uses of words and with the criteria or principles by which those uses are determined.

> The analysis of a concept is the description of its use. It is describing when the concept applies, when it does not, how its subtle nuances incline us to think one way or another when we use it, the delicate differences of meaning it receives in different contexts, and how the likenesses and differences between those contexts lead us to one or another use of the concept (Green, 1971).

How does concept analysis fit into the overall evaluation design? Since the answers to value, fact, and technical questions depend on the answers to concept questions, concept analysis should be done very early in the evaluation. Concept analysis should be done when the evaluation is being planned. Who should do the concept analysis? The evaluator should be able to do a concept analysis carrying out the instructions given in the rest of this paper. If funds were available and the evaluation was a large one, a philosopher could be employed to carry out the concept analysis.

Strategies of Concept Analysis

Soltis (1978) identified three basic strategies for doing concept analysis: a differentiation-type analysis, a generic-type analysis, and a conditions-type analysis. The next section of the paper will consist of a discussion of each of the three types.

A Differentiation-Type Analysis

Making distinctions is what this strategy is all about. The strategy proceeds by asking such questions as, "What are the different uses of the concept X?" or, "What are the various types of concept X?" and then seeking the distinguishing marks that separate these ideas. The intended result is a clearer idea of the logical terrain covered by different meanings of a concept. To illustrate differentiation-type analysis, the concept of "teaching" will be analyzed.*

Step I Search for the dominant standard uses of the concept by means of examples.

Teaching is a practical activity like painting a room or baking a cake. In order to discern the dominant standard uses of the concept of "teaching," we might list what a teacher does.

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*The analysis described is that given by Green (1971).

1. Explains
2. Asks questions
3. Evaluates
4. Takes attendance
5. Defines
6. Answers questions
7. Disciplines
8. Patrols the halls
9. Laughs
10. Collects money
11. Motivates
12. Consults with parents
13. Gives reasons
14. Demonstrates
15. Drinks coffee

We clearly could make a very long list if we wanted to. At the outset we would not want to include "Laughs" or "Drinks coffee," since a person other than a teacher also carries out these activities. The fact that we can readily make a list of what a teacher does means that we already know what teaching is. Green (1971) states:

> . . . the analysis of a concept cannot even begin unless we already have in mind some rough idea of what the concept is. . . . the aim is not to invent some new concept or idea of teaching, or even to specify what people ought to mean by "teaching." The objective is rather to study, clarify, and more thoroughly understand the idea of teaching that we already have. (p. 3)

Step II Intuitively classify or categorize the uses of the concept into types.

Using an expanded version of the list, the activities of teachers can be classified into three types: the logical acts, the strategic acts and the institutional acts. The following is Green's (1971, p. 4) classification:

The Logical Acts	The Strategic Acts	The Institutional Acts
Explaining	Motivating	Collecting money
Concluding	Counseling	Chaperoning
Inferring	Evaluating	Patrolling the hall
Giving reasons	Planning	Attending meetings
Amassing evidence	Encouraging	Taking attendance
Demonstrating	Disciplining	Keeping reports

Step III Search for distinguishing marks of each type which can be used to clearly separate types.

The logical acts refer primarly to the element of thinking or reasoning in the conduct of teaching. The strategic acts have to do with the teacher's plan or strategy and the ways material is organized or students are directed in the course of teaching.

Institutional acts are those which are performed as a result of the way the teacher's work is organized by the school as an institution.

The institutional acts of teaching may go on independently of the activity of teaching. Teaching does not require the institutional arrangements associated with schools. Teaching can occur between mother and daughter in the home. Quite typically, a mother teaches a daughter cooking and sewing. There is no need for the mother to collect money, patrol the halls, attend meetings, and so on. Teaching may go on even when institutional acts of teaching are not going on. But this is not true for the logical and strategic acts of teaching. The absence of the strategic and logical acts of teaching would count strongly against the view that teaching was going on.

The logical and strategic acts of teaching differ not only from the institutional acts, but also from each other. Learning can take place without the logical acts of teaching. For example, a teacher can give a good explanation of some concept, but at the same time the students may not learn or understand the concept. The explanation, while it is a good one, might not be understandable by elementary school students but may be suitable for a graduate seminar. Thus it can be decided whether a logical act is good without considering whether anyone learns from it. The performance of the logical acts of teaching can be decided on by an evaluator on logical grounds. In contrast, performances of the strategic acts of teaching are evaluated by their consequences for learning. Logical acts and strategic acts are evaluated differently. Logical acts require a knowledge of the methods of knowing. Strategic acts require a knowledge of human behavior and motivation.

Step IV Test the typology developed by means of examples and counter examples.

The typology will be tested by looking at five examples of teacher acts: questioning, defining, laughter, consulting parents, and comparing. Questioning can be classified as a

strategic act because it refers to a way of directing students during the course of teaching. Defining is a logical act because it refers to reasoning in the conduct of teaching. Laughter does not fall under any one of the types of teacher acts. Laughter is not an act of reasoning or thinking (logical act), a way of directing students (strategic act), or a way of performing which is shaped by the school (institutional act). Laughter is just one of a number of teaching acts that cannot be classified by the typology. Other examples are sitting, walking, running, and yawning. Can the typology be changed to accommodate such examples? The answer is that it could, simply by adding an "other" category. However, this "other" category is not particularly useful in explicating the meaning of teaching. Consulting parents is an institutional act, since it is performed as a result of the way the teacher's work is organized by the school as an institution. Comparing is a logical act, since it refers primarily to the element of thinking or reasoning in the conduct of teaching.

This completes the four steps of doing a differentation type concept analysis. The aim of differentiation-type analysis is to clarify and thus make more useful a concept by pointing to the different basic meanings it has. The form the prior question takes is "what are the basic senses of X?" First, seek examples from ordinary language which will display different uses or meanings of the term. The next step is to look for boundries between different uses of the term and come up with a typology. The next step is to search for distinguishing marks of each type when it can be used to clearly separate types. Finally, these distinguishing marks are tested and refined by means of examples and counter examples until a useful set of basic uses or meanings or types result.

A Generic-Type Analysis

Generic-type analysis is a means of clarifying a concept by identifying its key characteristics. The analysis tries to

identify the general or generic characteristics of a concept. The basic conceptual question, "What is an X?" is asked and taken to mean, "What are the basic features which make an X (species) an X (genus) and provide the criteria for distinguishing Xs from non-Xs?" Differentiation-type analysis distinguishes among the basic meanings of a concept, whereas generic-type analysis points to the necessary features of a concept.

The techniques of generic-type analysis will be illustrated by an example taken from an evaluation. An evaluator was doing an evaluation of a program within an institution for teacher training. There was a difference of opinion among the staff over whether teaching was a step-by-step procedure that could be taught to student teachers or whether it was an art that could be taught by emulation. The basic disagreement was summed up by the question, "Is teaching a science?" In order to answer the question, the evaluator carried out a concept analysis of the question.

Step I Isolate the conceptual question or questions from the rest of the question.

It will be noticed that the question is a mixed question, involving both the knowledge of the nature of teaching and an understanding of the concept of science. We will deal with the question of concept first.

Step II Apply the following techniques to the concept.

A. Model cases. Put forth an exemplary example of the concepts--that is, an example which we are absolutely sure is an instance of the concept, something of which we could say, "Well, if that isn't an example of so-and-so, then nothing is."

An exemplary model of a science is "the queen of the sciences," physics. Physics has a logical structure going from basic definitions to the formulation of general laws.

B. Contrary cases. Put forth an example that is a contrary case, one that certainly is not an instance.

A contrary example of science would be where someone painted a picture of a physicist at work. This activity is not like the sciences but belongs to the arts.

C. Related cases. Put forth an example that is a related or similar case; one that is in some way importantly connected.

A related example to science is knowledge, though all knowledge is not science. A more closely related example is knowledge of nature. However, such people as Wordsworth or Constable or even farmers could be said to know nature. They have factual knowledge, but they are not able to frame laws and hypotheses, and they do not do experiments.

D. Borderline cases. Put forth a case where we are not sure that it is an example of the concept. The point of such cases is to elucidate the nature of the concept by continually facing ourselves with different cases which lie on the borderline of the concept; what we might call odd or queer cases. By seeing what makes them odd or queer, we come to see why the true cases are not odd or queer, and hence what makes them true cases--what the central criteria of the concept really are.

A borderline case of science would be psychology. Psychologists do frame laws and hypotheses and they do experiments. However, it is still not certain that psychology is a science, since it can be argued that psychology does not tell us anything that we don't already know. Another borderline example is that of meteorology, or the predicting of the weather. Is it a science? It seems to depend on whether meteorology can predict the weather better than the ordinary human being. So prediction is an important criterion of science, as are experiments, theories, and hypotheses.

E. Invented cases. Wilson (1963) states: "Sometimes it is necessary to invent cases which are in practice quite outside our ordinary experience, simply because our ordinary experience does not provide us with enough different instances to clarify the concept." (p. 32)

Suppose I look into a crystal ball and predict accurately the winner of the Kentucky Derby every year. Suppose I have no idea how I do it and suppose that I conduct no experiments. I just look, and then tell you the winner. Is this science? No, not at all. Perhaps it would be if I added to the crystal ball some

equipment and did some experiments. Suppose I added a vast amount of equipment to the cyrstal ball, including wires and tubes, would this make it science? No, since I had dressed the ball to look like science. I had not arrived at my predictions by reasoning and observation. The equipment were not really connected with my predictions. Some more criteria for science are discernible. Firstly, the activity has to tell us more than we already know. Secondly, it has to do this not by guesswork but by observation, experiment, and the testing of hypotheses by experiment.

F. Social context. Concept questions are not asked in a vacuum but are asked under particular circumstances. The nature of these circumstances is important for understanding the concept question. We need to state or imagine, who would be likely to make such a statement, why he or she would want to make it, and when he or she would most likely make it.

In the case of "Is teaching a science?" we know the circumstances surrounding the question. There was a difference of opinion among the staff of a teacher training institution over whether teaching was a step-by-step procedure that could be taught to student teachers or whether it was an art that could be taught by emulation.

G. Underlying anxiety. Closely connected with the importance of looking at the social context of a question or statements is the importance of looking at the mood or feelings of the person(s) who makes it.

In relation to the question under consideration, there is an underlying anxiety that teaching might not be a science. There is an implicit belief that if any activity is a science, this then increases the prestige of the activity. Those who answer in the negative may be worried if teaching is taught as a science, teaching may itself become less warm and spontaneous.

H. Practical results. Since some conceptual questions have no right or wrong answer, we wonder if such questions have any meaning or point to them at all. One way to get at the point or

meaning is to ask what would be the practical results in everyday life if we answered, "Yes," or "No" to the question.

If we answer "Yes" to the question "Is teaching a science?" then teaching would involve an organized body of knowledge with facts and theories based on experiments. There would be professors of teaching, teaching from textbooks on the science of teaching. If we answer, "No" to the question, then teacher trainees cannot be taught teaching by laying down a step-by-step procedure for carrying out teaching.

I. Results in language. Since words are not used without ambiguity, and it is not always possible to say what the meaning of a word is, we may often be left with the situation in which we have to say, "Well, if you mean abc by so-and-so, then the answer is this. But if you mean xyz, then the answer is that." Wilson (1963) states:

> . . . we have to look at the "results in language" when choosing meanings for words or delineating areas for concepts: we have to pick the most useful criteria for the concept. Thus, when (but only when) we have analyzed the concept and noted the whole wealth of possible instances of it, we may often have to say at the end, "Amid all these possible meanings of the word so-and-so, it seems most sensible and useful to make it mean such-and-such: for in this way we shall be able to use the word to its fullest advantage." (p. 37)

If we find that teaching satisfies some criteria of science but not others, we might want to call it a science, even if this means stretching the concept of science beyond its normal limits. On the other hand, if teaching satisfies none of the criteria, or only the less important ones, we have no reason to extend the concept of science to include it.

Step III Conduct a dialogue with yourself about the concept.

Ask yourself questions and answer them. Invent new cases when that seems helpful. Go back to the application of the techniques in the last step. The following is an interior dialogue over the question, "Is teaching a science?"

> What are the criteria for science? Firstly, a science must be able to make predictions beyond that made by the average man. Anyone can predict a storm from looking at

the clouds. But for meteorology to be a science it must be able to predict rain when the average man cannot. Since an average man may be able to guess correctly at times, meteorology has to predict successfully in a consistent manner.

Secondly, the prediction must be made on the basis of some organized technique, observation, reasoning or experiment. On this basis one would rule out crystal ball gazing.

Thirdly, an ability to explain is a necessary criterion of science. Toulmin (1961) states:

> Forecasting, then, is a craft or technology, an application of science rather than the kernel of science itself. If a technique of forecasting is successful, that is one more fact, which scientists must try to explain, and may succeed in explaining. Yet a novel and successful theory may lead to no increase in our forecasting skill; while, alternatively, a successful forecasting-technique may remain for centuries without any scientific basis. (p. 36)

Take an example from early astronomy where there was a high level of ability to predict but not to explain. Early astronomy observed the stars and planets and noticed that they move in certain regular orbits over certain time periods. By dint of constant observation, but no theorizing about causes, early astronomy was able to predict accurately what planets will be in what part of the sky at certain times. While science is expected to be able to predict, it is not an essential criterion but the ability to explain is.

Is teaching a science? Teaching is a practical activity, not an organized body of knowledge. It may draw on concepts from psychology and sociology which are organized bodies of knowledge, but there are no step-by-step teaching procedures which are based on organized knowledge drawn from observation, experiment, or theories.

Is teaching capable of making predictions? Teaching is a practical activity which does not aim to make predictions. A necessary criterion of a science is that it has the ability to explain phenomena. Teaching does not aim to make explanations.

The question, "Is teaching a science?" might be taken to mean, "Is teaching scientific?" That is, is teaching based on scientific ideas and theories? Some ideas about teaching are drawn from psychology and sociology, but the

connections are rather loose. There is some doubt whether these are sciences, since they put forward knowledge which is already possessed by the average man.

Step IV List on paper the points you are going to make and the conclusion you are going to reach.

A. Science is more than the knowledge possessed by the average man.

B. Science is an organized body of factual knowledge and theory about the phenomena of nature and is logically unlike art or aesthetic appreciation.

C. The criteria for science seem to be:

1. The ability to predict with reasonable consistency in areas where the ordinary man cannot do so.

2. The predictions must be firmly based on observation, theories and experiments, in such a way that they can be seen to issue from these.

3. The ability to explain phenomena.

D. Teaching is not a science, since none of the above criteria are satisfied.

E. The question, "Is teaching a science?" might be phrased as "Is teaching based on scientific ideas and theories?" However, teaching is only loosely tied to scientific ideas and theories drawn from psychology and sociology which themselves may be considered on the borderline between science and non-science.

A Conditions-Type Analysis

A generic-type analysis or a differentiation-type analysis may not always seem useful or possible. For example, model cases from which to draw potential generic features do not seem to be readily available. We may not be sure what would count as a model case of "teaching," "explaining," or "understanding." The point of departure for a conditions-type analysis is to puzzle over the context appropriate for the use of the concept and not so much over its more acontextual generic meaning or its different senses (Soltis, 1978).

> The form the conceptual question [of a conditions-type analysis] takes is: "Under what conditions or under what circumstances would it be true to say that X?" (e.g., to say that someone knows something . . . .) The point of the general strategy of a conditions-type analysis is to try to identify the necessary and sufficient conditions required to properly apply term X and to test by example cases in which a condition holds but application of the concept is withheld. This helps locate the need for additional conditions (Soltis, 1978, p. 51).

A common problem in evaluation is to know what should count as a case of successful learning and teaching of some knowledge that. Knowing that can be contrasted with knowing how. The distinction may be stated as a logical difference between knowing facts or having information (that), and possessing skills, or being able to perform certain operations (how). The following are the steps of a conditions-type analysis applied to the conceptual question: "Under what conditions or under what circumstances would it be true to say that someone knows something?"

Step I Identify a good candidate for being a necessary condition of X happening or X being present in a situation.

At least one condition that must hold for the ascription of knowledge to someone is that the proposition must be true. Soltis (1978) states: "Truth is a fundamental condition of knowledge. Although I might be taught and, in fact, learn that the earth is flat or that water boils at 0°C, such propositions obviously do not constitute knowledge about the earth or about the properties of water. "True knowledge" is a redundancy, for we only count as knowledge that which we also count as true." (p. 49)

Step II By altering the context, try to find an example where the condition holds, but X or Xing is not present.

One could alter the context to a case where a student made a claim to know on the basis of making a lucky guess and being right. The condition identified in Step I (i.e. the proposition must be true) still holds but knowing is not present. Thus we

have found an example where the condition holds, but knowing is not present.

Step III Revise or modify the condition to meet the context problem or tease out from the altered context another condition and test it.

We tease out a new condition that we need evidence of what the student claims to know. In essence, this evidence condition requires that the student back up his or her beliefs and provide some grounds or warrant for what he or she takes to be true. It requires that the student provide reasons, evidence, or proof for what the student asserts he or she knows. Pedagogically speaking, we generally expect that students should learn what constitutes adequate evidence, good reasons, or reliable proofs for some beliefs, so that they may be better prepared to acquire knowledge on their own and, in the future, to test t eir own knowledge claim and those of others (Soltis, 1978).

Step IV Test the necessity and sufficiency of the conditions arrived at.

But what constitutes adequate evidence or proof? It is not enough to be in possession of the evidence. One must understand the proof and see its point. An example of a mystery story explains this. Prior to the super sleuth's inevitable announcement of the murderer's identity, all the clues, all the evidence has been woven into the details of the story. The reader has the evidence, but it takes the detective to pull it all together in a persuasive pattern before the reader sees that only the butler could have done it (Soltis, 1978). Thus the condition that we need evidence of what the student claims to know is not a sufficient condition.

This completes the discussion of the three types of concept analysis: differentiation-type, generic-type, and conditions-type. Step by step procedures were given for each type. It might be found in some analyses that it is advantageous to use two or more of the types in combination.

How to Choose Which Strategy to Apply

Choosing which of the three strategies to apply depends on the nature of the conceptual question being asked. Most of the concept questions asked in an evaluation will require a generic-type strategy. They will be of the form, "What is X?" or "What is meant by X?" e.g., "What is compensatory education?" or "What is meant by equality of educational opportunity?" In other words: "What are the basic features which make compensatory education a form of education and provide the criteria for distinguishing compensatory education from non-compensatory education?" Generic-type analysis is a means of clarifying a concept by identifying its key characteristics.

If the concept question in an evaluation requires making distinctions, then a differentiation-type analysis is called for. For example, the question, "What is the difference between teaching and indoctrination?" requires one to make distinctions between different forms of education. In differentiation-type analysis we clarify and thus make more useful a concept by pointing to the different basic meanings it has. The concept question takes the form "What are the basic senses of X?" The strategy is to seek examples from ordinary language which will display different uses or meanings of the term.

A generic-type analysis or a differentiation-type analysis may not always seem useful or possible so that a conditions-type analysis may be carried out. For example, model cases from which to draw potential generic features do not seem to be readily available. An example of a conditions-type analysis question is: "Under what conditions would it be true to say that someone knows something?" The purpose of a conditions-type analysis, then, is to produce the set of necessary and sufficient conditions for the proper application of a concept to any of its many and varied instances. A generic-type analysis, on the other hand, seeks to determine the essential characteristics of the paradigmatic form of a concept (Soltis, 1978).

Concept Maps

Concept maps portray the conceptual structure of an evaluation study. Concept maps elaborate and make clear how the concepts in an evaluation study are related to one another. A concept map may be drawn after an evaluation is complete for the purpose of carrying out a meta-evaluation of the evaluation study. Alternatively a concept map may be drawn during the planning stage of an evaluation in order to clarify the conceptual structure of the evaluation. In order to understand what a concept map is, an example of one will be described.

Gowin (1979) has drawn a concept map for the evaluation study conducted by Kaplan (1966) and titled "Head Start Experience and the Development of Skills and Abilities in Kindergarten Children". To understand the concept map it will be necessary to give a brief description of Kaplan's study. The following description was written by Kaplan.

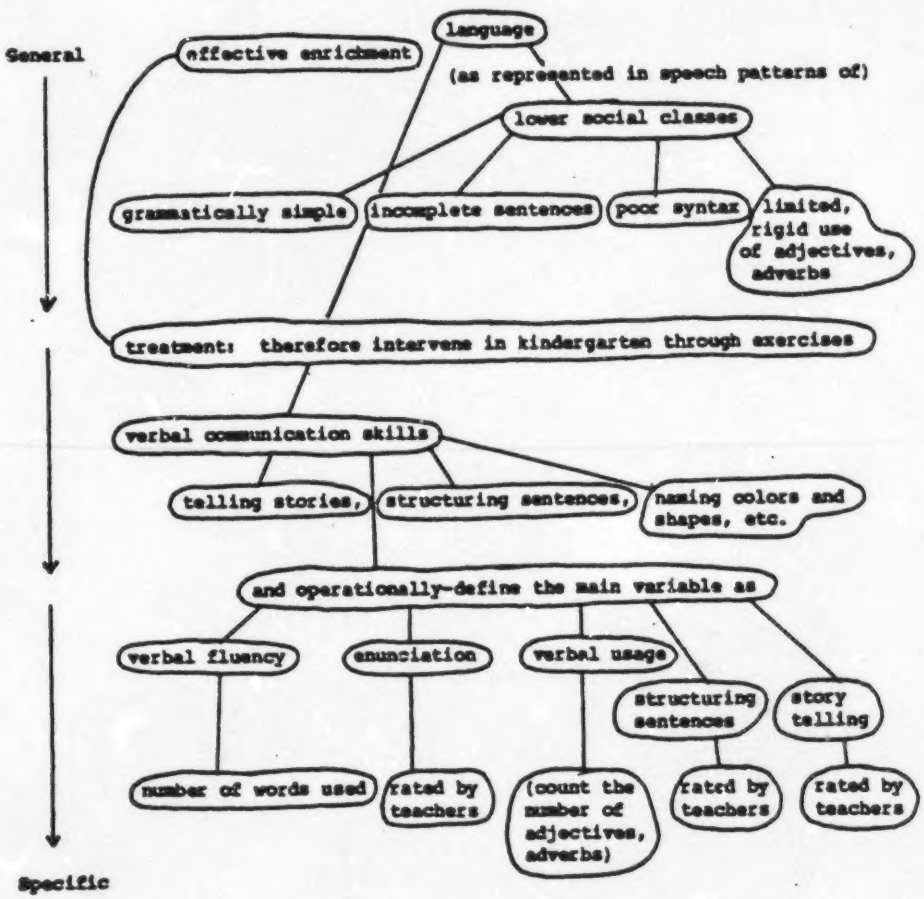
> The purpose of this study was to assess whether the children who participated in Project Head Start were better prepared for kindergarten than those who did not participate in regard to verbal communication, visual discrimination and naming, and motor coordination skills. It was hypothesized that kindergarten children who participated in Project Head Start would be superior in verbal communication abilities as measured by verbal fluency, verbal usage, enunciation, ability to structure sentences, and ability to tell a story; that they would be superior in the visual discrimination and naming of colors and shapes; and that they would be superior in motor coordination skill, as measured by drawing figures, coloring, cutting, and buttoning their clothing.
>
> The subjects were seventy kindergarten children between the ages of four and five who were identified on the basis of whether or not they had participated in the Head Start program during the summer of 1965. Thirty-five children who had participated in this project were paired with thirty-five children who had not participated in the project using sex, age, ethnic background, language spoken in the home, age of siblings, and preschool experience as the criteria.
>
> The subjects were then compared with respect to their verbal communication abilities. They were asked to tell everything they saw in a sample picture and to tell a story about that picture. They were rated according to

the ability to structure sentences, story-telling ability, verbal fluency, verbal usage, and enunciation.

The subjects in each group were also compared in their visual discrimination abilities. Four colors and three shapes were presented to each child who was then asked to name each color and shape. The children's productions provided data to evaluate their cutting, coloring, and drawing skills. The children's ability to button their own clothing was also observed.

The present findings support the current view that culturally deprived children benefit from preschool enrichment programs. It was suggested that future research should further examine the values of preschool compensatory programs and establish an appropriate curriculum. Longitudinal studies are needed in order to ascertain the long-term benefits of such a program. (Millman & Gowin, 1974, pp. 37, 38)

Concept Map



The concept map shows the interconnection of concepts as they were used in the evaluation study. The most general concepts are put at the top of the page and there is a transition to the most specific at the bottom of the page. As one moves down the page, the key concepts move toward actual events. In addition there is a loss of abstraction, a gain in precision, and an increased likelihood the events of interest will be trivialized by the selection of indicators as they are operationally defined.

Doing a concept map helps to reveal the thinking and reasoning behind a study. If the concept map is drawn during the planning stage of an evaluation, the evaluator can determine where his or her reasoning is weak or ineffective. It is important to do this since the whole conduct of an evaluation is dependent on the reasoning behind the evaluation. Other examples of concept maps are given by Gowin and Green (Note 1), and Lane (Note 2).

When Should Concept Analysis be Used?

Constructing a concept map would be helpful in clarifying the reasoning and thinking which lurks behind an evaluation. Doing a concept map causes the evaluator to examine and to be more explicit about his or her thinking. A concept map will often help the evaluator discover flaws in his or her thinking and reasoning. Thus it is recommended that a concept map would be an aid to doing any evaluation.

When the questions in an evaluation contain abstract terms then it is recommended that one of the three strategies of concept analysis be carried out. Concept analysis is also needed when people talk past each other using the same terms or when different people interpret the same data differently.

The generic-type analysis was illustrated by an example of an evaluation in which the concept question asked was "Is teaching a science?" This example suggests the difficulty of such an analysis and one needs to decide a priori whether or not the analysis is really warranted.

Further Reading

For further details on concept analysis, thre books are recommended. Thomas Green's (1971) book The Activities of Teaching contains examples of concept analysis. Chapter One examines how concept analysis is carried out. It was from Chapter One that the differentiation-type analysis given in this paper was taken. John Wilson's (1963) book Thinking With Concepts contains many examples of generic-type analysis. This book was written for high school students and the exposition is very clear. Jonas Soltis' (1978) book An Introduction to the Analysis of Educational Concepts gives examples of each of the three strategies for concept analysis.

Reference Notes

1. Gowin, D. B. and Green, T. The Education document. No. 38 in the Research on Evaluation Program Paper and Report Series. Portland, Oregon: Northwest Regional Educational Laboratory, 1980.

2. Lane, C. Using the tools of philosophy in school program evaluation: Metaphor in action. No. 55 in the Research on Evaluation Program Paper and Report Series. Portland, Oregon: Northwest Regional Educational Laboratory, 1981.

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